

Headquarters U.S. Air Force

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USAF Tropical Cyclone Support and Needs

**Year of the Air Force
Family**



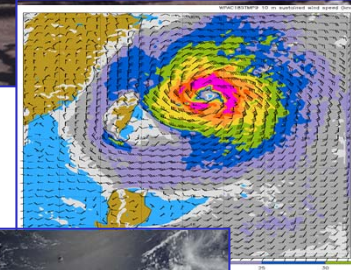
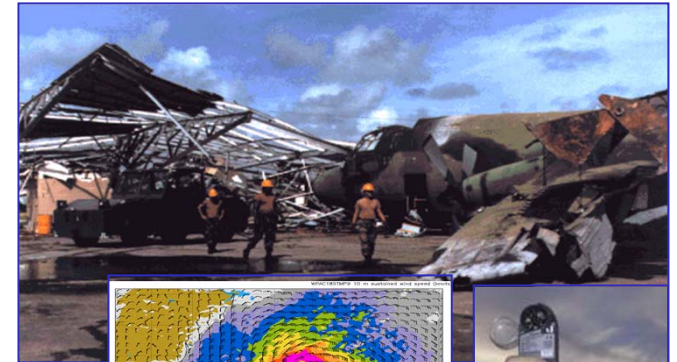
**Air Force Director
of Weather**

1 March 2010

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 01 MAR 2010		2. REPORT TYPE		3. DATES COVERED 00-00-2010 to 00-00-2010	
4. TITLE AND SUBTITLE USAF Tropical Cyclone Support and Needs				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Headquarters U.S. Air Force, Air Force Weather Agency, Offutt AFB, NE, 68113				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES At the 64th Interdepartmental Hurricane Conference (IHC), Savannah, GA, Mar 1-4, 2010					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 13	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



- Tropical Cyclone Support
- Operational Priorities
- Critical Partnerships
- Strengths for Research
- Research and Ops ... Need your continued support



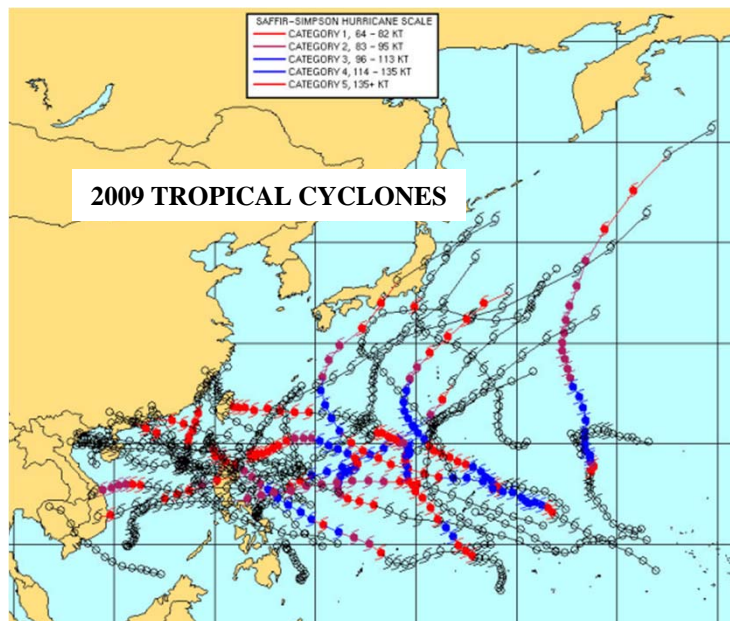
AFW Focused on Supporting the Joint Warfighters

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USAF Tropical Cyclone Support

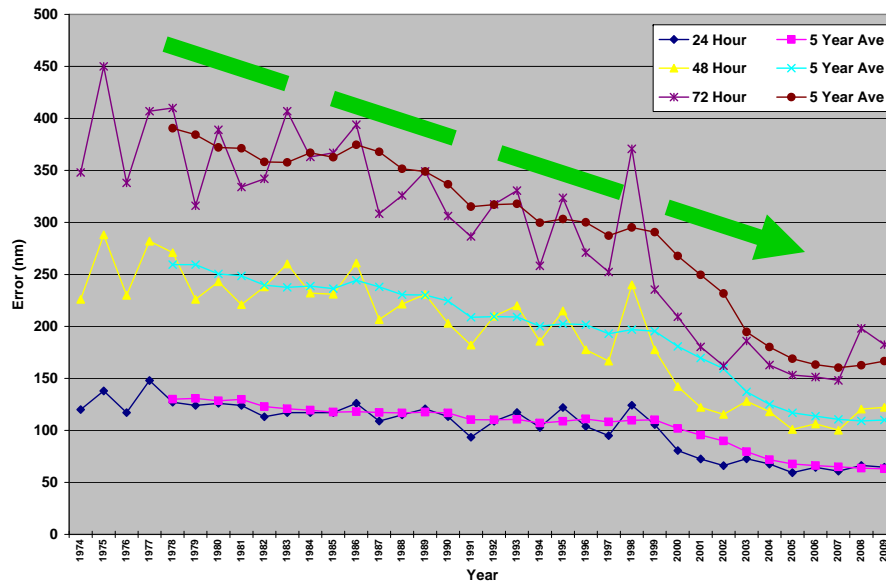
- Typhoon warning capability critical to warfighters in Pacific/Indian Oceans
- Must continue to work *JOINTLY* to improve forecast and warning accuracy
- To improve we need the right mix of research and operational focus with technology as the enabler





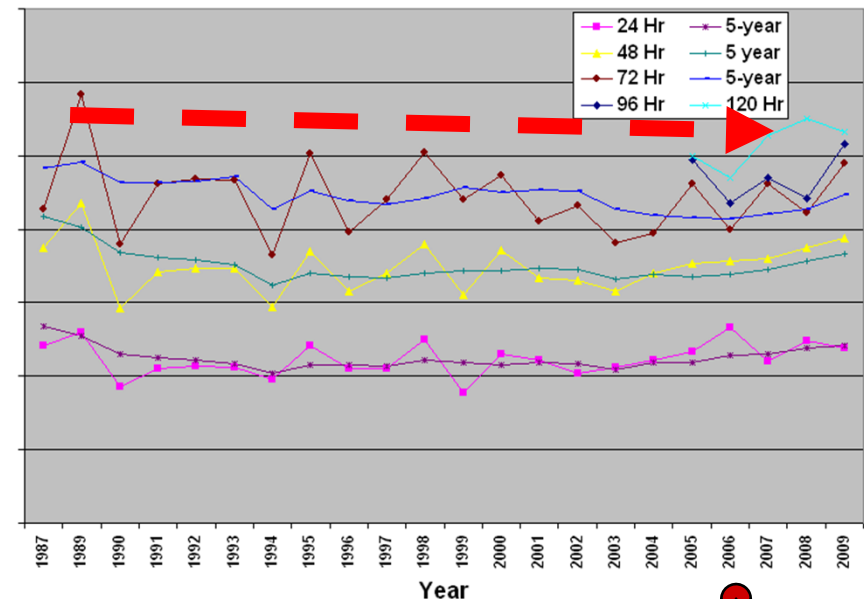
Progress thus far ... 30 years of focused R&D and T2

WPAC Track Error



Impressive!
Improvement factor
2.0 – 2.5!

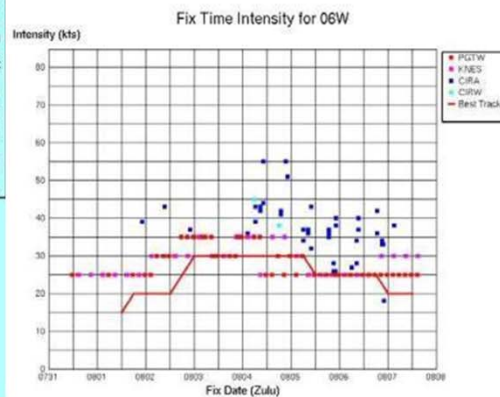
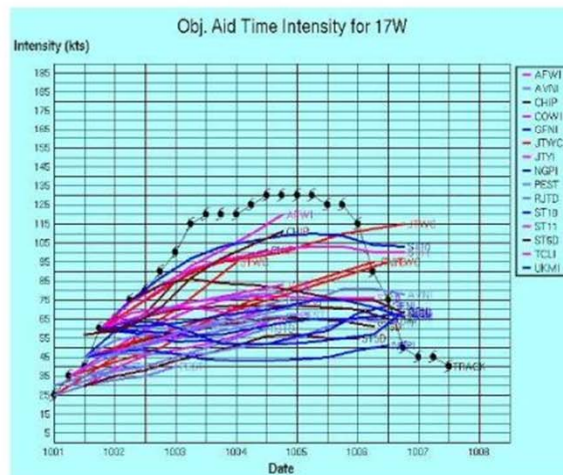
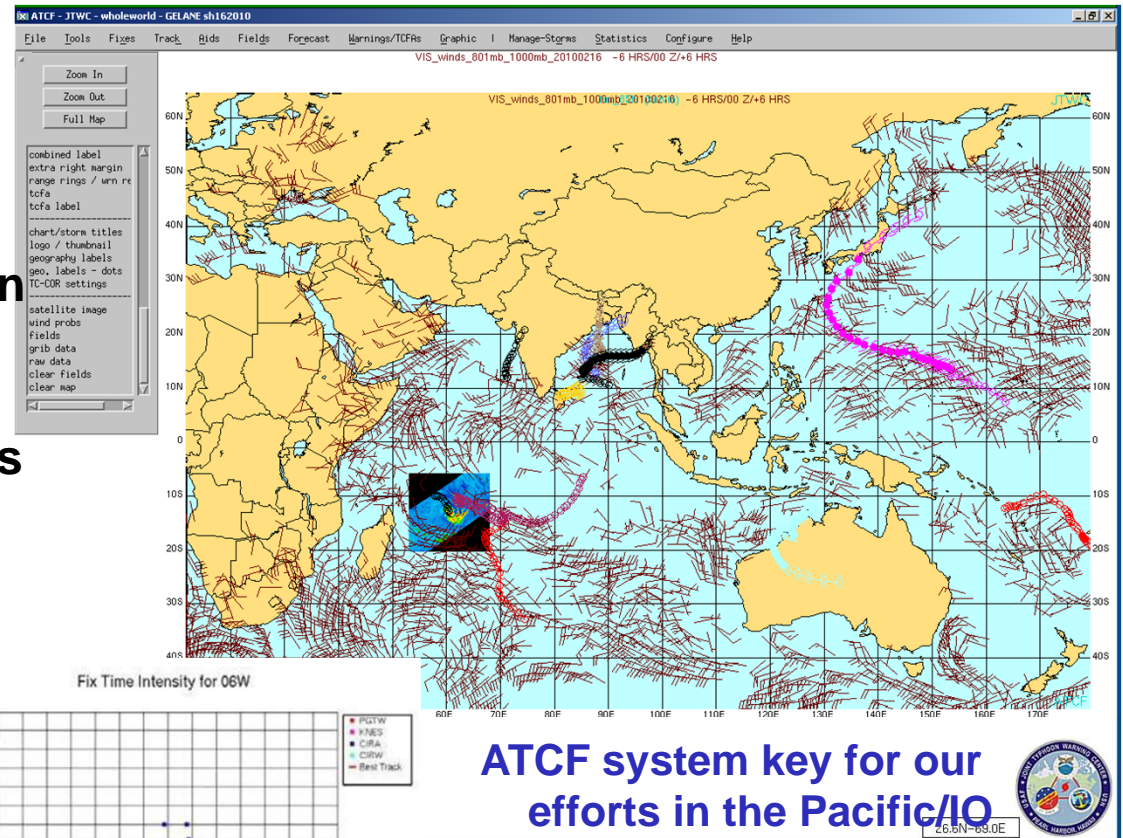
WPAC Intensity Error



We must work this by 2015



- Intensity guidance/rapid intensification
- TC/environmental characterization/observation
- Genesis guidance
- Enhance TC forecaster tools



ATCF system key for our
efforts in the Pacific/IO



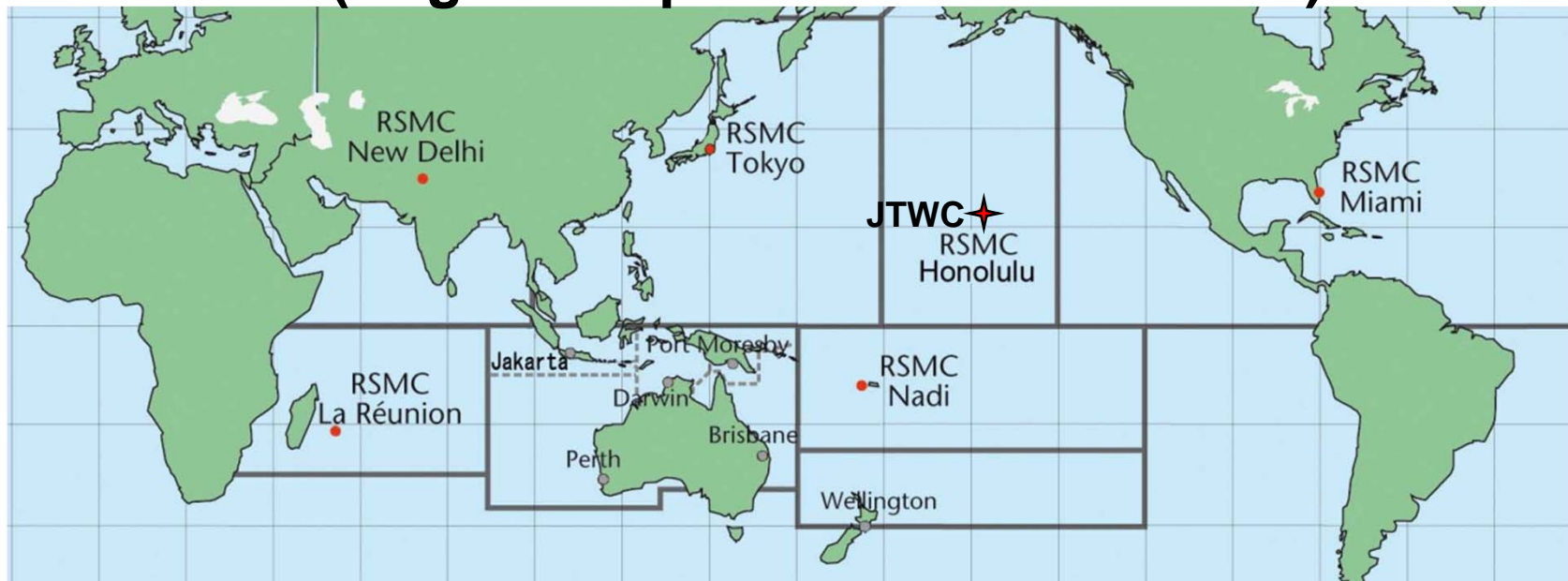


How to get there

Critical Partnerships

■ Operational partnerships

- USAF/Navy
- NHC, CPHC
- NOAA: NWS, NESDIS, OAR
- RSMCs (Regional Specialized Met Centers)

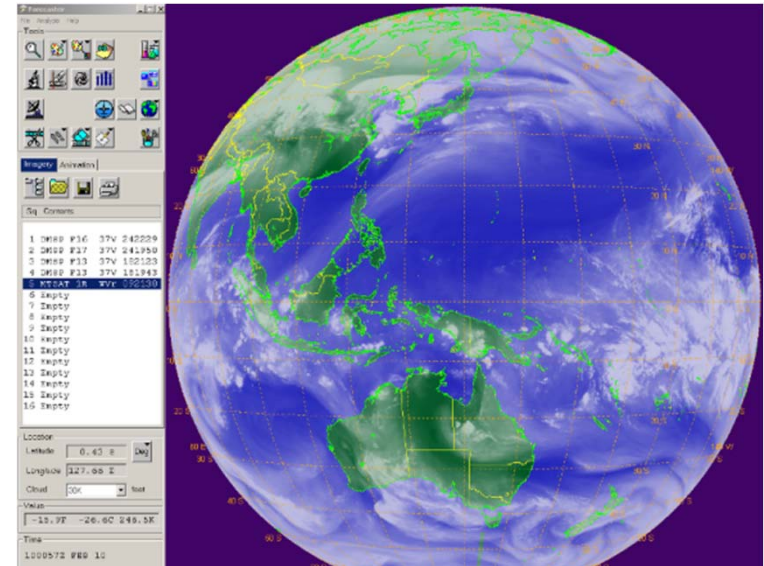




USAF Tropical Cyclone Support

Strengths for Research

- **Hurricane Hunters – WC130J**
 - **AFRC environmental recon mission corrects/validates satellite interrogation techniques**
- **Leverage RPA capabilities**



- **AF Weather has near-real time access to global interrogatable imagery**
 - **Could be formatted and disseminated for research projects**



USAF Tropical Cyclone Support

Strengths for Research

- **Continue to send AF officers through Naval Post Graduate programs to earn tropical-related masters degrees**



- **Joint Typhoon Warning Center (JTWC) operationalizes mature research through its techniques development section**
- **JTWC data available in digital formats**
 - **Easily leveraged for research**

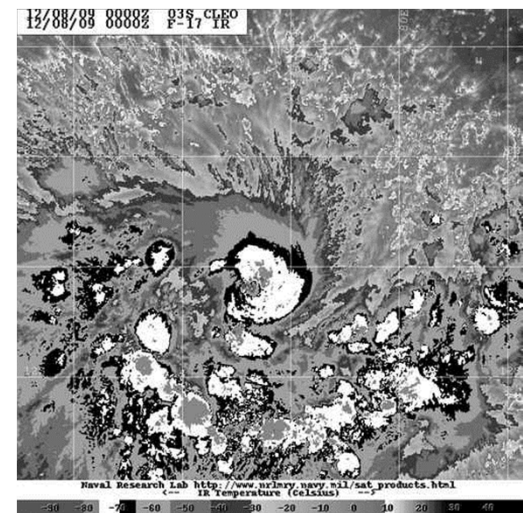




We need research community support

■ Top priority is intensity/structure...need improved:

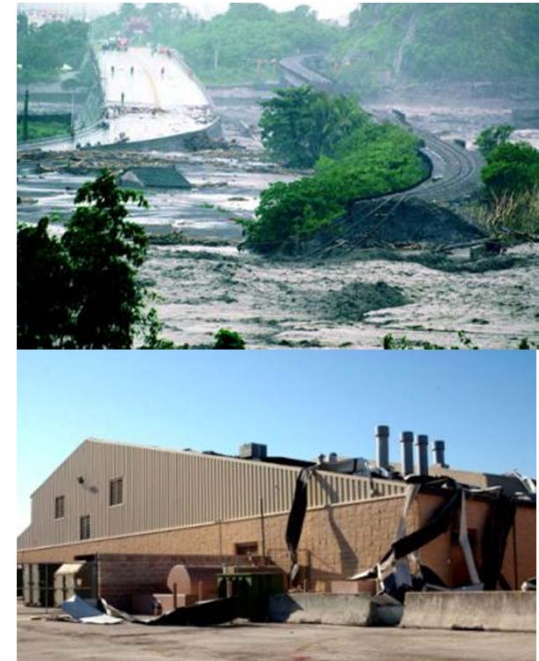
- Cyclone intensity/structure change
 - Rapid intensification
- Specification of cyclone structure (wind strength and distribution)
- Satellite-based intensity/structure estimates – including microwave



- ### **■ Climate change influence on cyclone tracks / intensities**
- Impacts on other parts of the world (e.g., Africa, Indian Ocean)



- Typhoon warning capability critical to warfighters in Pacific/Indian Oceans ... important to operations and saving lives!
- Must continue to work *JOINTLY* to improve forecast accuracy... we need to significantly improve intensity forecasts by 2015!!
- This is a TEAM SPORT ... Thanks to everyone for the great work!!



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Questions?



We Support the Joint Warfighters...7X24!

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USAF Tropical Cyclone Support

AFIT Thesis Topics

- **Develop Improved Methodology to Analyze Tropical Cyclone (TC) Intensity and Wind Distribution from Microwave Imagery**
- **Sensitivity of the Numerical Model Tropical Cyclone Forecasts to Tropical Cyclone Bogus Input**
- **Effect of Ocean Heat Content / Tropical Cyclone Heat Potential on rapid TC intensification or dissipation in the western North Pacific**
- **Diagnose Mechanisms and Synoptic Patterns Associated with Rapid Intensification of Tropical Cyclones in the western North Pacific**
- **Improve 96- and 120-hr JTWC forecast track accuracy during extratropical transition (ET) in the western North Pacific**
- **Diagnosing Preferential Formation of TC from Multiple Circulations**
- **Monsoon Depression Climatology and TC transition mechanisms**



- Operations input into research decisions (OFCM WG/TCR)
- Communications and interoperability (e.g., ATCF, WRF TC Tracker)
- National and international collaboration
 - Data exchange (Collab Website)
 - Space-based sensing (GEO/LEO, JAXA, EUMETSAT, NASA)
 - Modeling (NCEP, BoM, JMA, UKMO, CMA, ECMWF)
- TPARC/TCS-08 & ITOP/TCS-10 (WC-130J, DOTSTAR)
 - JTWC active participation

